UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,367	08/15/2001	Tomoyuki Yorinaga	067183-0192	8853

44987 7590 03/03/2006

HARRITY SNYDER, LLP
11350 Random Hills Road
SUITE 600
FAIRFAX, VA 22030

EXAMINER	
MERED, HABTE	

ART UNIT	PAPER NUMBER
2662	

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/929,367	YORINAGA ET AL.	
	Examiner	Art Unit	
	Habte Mered	2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed on 14 December 2005 has been entered and fully considered.

2. Claims 1-9 are currently pending.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1-3 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoogenboom et al (US Pub. No. 2002/0054568), hereinafter referred to as Hoogenboom, in view of Zhang et al (Zhang et al, "Integrated Rate and Credit Feedback Control for ABR Service in ATM Networks", IEEE, 1997, Pages 1295-1303), hereinafter referred to as Zhang, and Carr et al (US 6, 642, 293) et al, hereinafter referred to as Carr.

Hoogenboom discloses an ATM switch with rate limiting congestion control.

5. Regarding **claim 1**, Hoogenboom discloses a switch **(Figure 1)**, comprising: one or more input side circuit interfaces **(Figure 2, element 210; Figure 4, element 420; Figure 5, element 520; Paragraph 24:Lines 1-15)**; one or more output side circuit interfaces **(Figure 2, element 220; Figure 4, element 430; Figure 3, element 320; Paragraph 25)**; and a core switch for outputting cells inputted thereto from the input

side circuit interface or interfaces to the output side circuit interface or interfaces **(Paragraph 2, Lines 1-6; Paragraph 13, Paragraph 24, Last line)**;

each of the output side circuit interfaces feeding back a congestion control signal for each virtual channel to a corresponding one of the input side circuit interfaces **(See Figure 5, signal 525. Hoogenboom shows in Paragraph 26 that the control has an accumulator for each virtual connection keeping track of the total cell count for the virtual connection. Based on the total cell count of each virtual connection a feedback to the input side is sent. See Paragraph 28, Lines 1-10; Paragraph 34, Lines 12-20 and signal 525 in Figure 5)**

each of the input side circuit interfaces shaping the rate of cells based on the feedback from a corresponding one of the output side circuit interfaces **(Hoogenboom shows in Figure 5 for each input side circuit interface a rate filter 570 with input control 560 with output feedback 525 shaping the cell rate. See Paragraph 34 too. Hoogenboom further discloses in Paragraph 24 the rate limitation is policy based.)** each of the output side circuit interfaces controlling the rate, based on the cell number accumulated for each virtual channel. **(Hoogenboom shows in Figure 3 for each output side a rate-filter 360 and output control 360 and further in Paragraph 26 he shows that for each virtual connection total cell count is maintained and based on the count rate limitation is enforced by the rate-filter.)**

6. Regarding **claim 2**, Hoogenboom discloses a switch, wherein each of the input side circuit interfaces includes a physical layer processing section which terminates a cell **(Paragraph 2)**, and an input virtual channel cell rate control section for receiving the

cell terminated by the physical layer processing section and controlling the rate of cell for each virtual channel **(Figure 5, element 520)** based on the feedback signal **(Figure 5, element 525)**. **(See Figure 5 and Paragraph 31)**

7. Regarding **claim 3**, Hoogenboom discloses an ATM switch, wherein each of the output side circuit interfaces **(Figure 3)** includes an output virtual channel cell rate control section **(Figure 3, elements 350 and 360)** for storing a cell number accumulated for each virtual channel **(Column 3, Lines 1-7, Paragraph 26)**, an output virtual path cell rate control section for controlling the cell rate for each virtual channel based on the cell number accumulated in the output virtual channel cell rate control section **(Figure 3, elements 350 and 360)**, and a physical layer section for outputting a cell from the output virtual channel cell rate control section to a circuit **(Figure 3, element 330)**, and the output virtual channel cell rate control section with a feedback signal **(Figure 5, element 525)**. **(See also Paragraphs 25 and 26)**

8. Regarding **claim 7**, Hoogenboom discloses a switch **(Figure 1)** comprising: an input processing section **(Figure 2, element 210; Figure 4, element 420; Figure 5, element 520; Paragraph 24:Lines 1-15)** configured to: receive cells via a plurality of virtual channels (VCs) of a virtual path (VP) **(Paragraph 2, Lines 1-6; Paragraph 13, Paragraph 24, Last line)**, and output, cells for each VC at a rate equal to or higher than a minimum cell rate based on a control signal **(Hoogenboom shows in Figure 3 for each output side a rate-filter 360 and output control 360 and further in Paragraph 26 he shows that for each virtual connection total cell count is maintained and based on the count rate limitation is enforced by the rate-filter. Hoogenboom also**

shows in Paragraph 26 has an accumulator for each virtual connection keeping track of the total cell count for the virtual connection. Based on the total cell count of each virtual connection a feedback to the input side is sent. See Paragraph 28, Lines 1-10; Paragraph 34, Lines 12-20 and signal 525 in Figure 5. Further as illustrated in Paragraph 29, Hoogenboom system supports ABR services and ABR services by ATM Forum definition ensures a transmission rate, r, such that MCR < r< PCR); and an output processing section **(Figure 2, element 220; Figure 4, element 430; Figure 3, element 320; Paragraph 25)** configured to: store the cells from the input processing section for each VC, determine a number of stored cells for each VC, generate the control signal, transmit the control signal to the input section, determine a number of stored cells for the VP**(Hoogenboom shows in Paragraph 26 has an accumulator for each virtual connection keeping track of the total cell count for the virtual connection. Based on the total cell count of each virtual connection a feedback to the input side is sent. See Paragraph 28, Lines 1-10; Paragraph 34, Lines 12-20 and signal 525 in Figure 5)**.

9. With respect to **claims 1-3 and 7**, Hoogenboom fails to disclose a buffering arrangement where the output sends a total cell count of each virtual connection to the corresponding input side for congestion monitoring.

Zhang discloses a flow-control scheme that combines the merits of credit and rate based flow control schemes by applying direct control over both bandwidth and buffer resources.

Zhang discloses a buffering arrangement where the *output* sends a total cell count of each virtual connection to the corresponding input side for congestion monitoring. **(Zhang teaches a system that incorporates both rate based and credit based approaches. It uses the Resource Manager (RM) cell to feedback rate and credit information from the destination (i.e. output or receiver) to the source (i.e. input or sender). The RM cell format and the framework of Zhang's invention are shown in Figure 1. On the destination side, Zhang shows the control algorithm updates a local count, $U_{cnt,}$ each time a data cell is received as shown in the pseudo code line 3 in Table 1. Further the same value of U_{cnt} is populated in the CU field of the RM cell and forwarded to the source side as shown in the pseudo code line 6 of Table 3. The value passed to the source is used to decide if a new rate is needed or if the buffer is congested as shown in the pseudo code for the source side in Table 1. See also page 1296, 2nd Column, Lines 1-10 and page 1298, 2nd column, Lines 1-5)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hoogenboom's apparatus to incorporate a buffering system that provided sending total cell count for each VC to the input side. Hoogenboom discusses in Paragraph 28 accumulating cell counts and monitoring it for different combinations but does not disclose what these combinations are and how they are identified and accumulated and the relationship to the monitoring entity in the output control. Hoogenboom further discusses in Paragraph 34 that an "activate congestion control" signal will be sent from the output to the input but fails to disclose the message

format and content. Zhang shows that the total count of the received cell is sent to the source to determine a new rate for the source. Zhang discloses the RM cell provides feedback to the input and discloses the content and format of the message and indicates the CU field of the RM cell is populated with the total count of received cell.

Hoogenboom also fails to disclose that the rate limitation on the input and output side is based on a peak cell rate total value of virtual channels which belong to a virtual path may not exceed a peak cell rate of the virtual path.

Carr teaches joint VC level shaping and VP level shaping.

Carr discloses that the rate limitation on the input and output side is based on a peak cell rate total value of virtual channels which belong to a virtual path may not exceed a peak cell rate of the virtual path. **(Carr shows in Figure 3 and Figure 4 VP shaping. Carr provides inter VP and intra VP shaping as shown in Figure 4. The shaping can be based on Peak Cell Rate as indicated in Column 4, Line 43. Certainly the VP shaper task is to enforce the peak cell rate total value of virtual channels which belong to a virtual path may not exceed the peak cell rate of the virtual path.)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hoogenboom's apparatus to incorporate VP shaping. Hoogenboom in Paragraph 29 indicates rate limitation should be based on policy and Carr provides a traffic policy based on VP shaping.

10. **Claims 4 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoogenboom in view of Zhang and Carr as applied to claims 1 and 7 above, and further in view of Kozaki et al (US 6, 775, 287), hereinafter referred to as Kozaki.

The combination of Hoogenboom and Zhang teaches all aspects of the claimed invention as set forth in the rejection of claims 1 and 7 but does not disclose output buffer type switching with cell multiplex circuit.

Kozaki teaches an ATM switching system and an ATM cell control method suitable for burst data communication.

Kozaki disclose an ATM switch **(Figure 3)**, wherein the ATM core switch includes multiplexing means for multiplexing cells from all of the output side circuit interface sections **(L2-1...L2-N in Fig. 3)**, filter means **(12-1 ....12-N in Figure 3)** for comparing output port identification numbers applied to the cells with output port numbers of the filter means themselves and passing there through only those cells which exhibit coincidence in the comparison, and a cell buffer of the first-in first-out type**(14-1...14-N in Figure 3)** provided for each output port for temporarily storing those cells which have passed through the corresponding filter means, converting the rate of the cells and outputting the resulting cells to a corresponding one of the output side circuit interfaces **(15-1...15-N and 16-1...16-N)** . **(See Figure 3, Figure 6, Column 4, Lines 56-67; Column 5, Lines 1-15; and Column 6, Lines 44-67)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus that resulted from the combined invention of Hoogenboom and Zhang by using an output buffer type switching with cell multiplex

circuit. The motivation being Hoogenboom teaches a way of handling "infrequent " burst data transmission in Paragraph 29 but fails to disclose a method of handling a consistent large amount of burst data and Kozaki in Column 1, Lines 54-60 and Column 2, Lines 25-67. A further motivation being Hoogenboom discusses an ATM core switch but fails to show how the actual core switch transmits data from the input to the output and the hardware involved. Kozaki shows in Figures 3 and 6 the core switch consists of a multiplexer, filters and buffers.

11. **Claims 5 and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoogenboom in view of Zhang and Carr as applied to claim 1 above, and further in view of Endo et al (US 6, 275, 494), hereinafter referred to as Endo.

12. Regarding **claim 5**, the combination of Hoogenboom, Carr and Zhang teaches all aspects of the claimed invention as set forth in the rejection of claim 2 but does not disclose an ATM switch, wherein the input cell rate control section stores an input circuit number, a service class, a minimum cell rate, an output switch port number and an intra-switch connection identification number of contents of a contract concluded in advance in a corresponding relationship to a virtual path identifier/virtual channel identifier of an input cell.

Endo discloses an ATM switch, wherein the input cell rate control section stores an input circuit number, a service class, a minimum cell rate, an output switch port number and an intra-switch connection identification number of contents of a contract concluded in advance in a corresponding relationship to a virtual path identifier/virtual channel identifier of an input cell. **(Endo shows in Figure 5 the details of a header**

conversion table located in an input interface and labeled as element 62 in Figure 4. The output interface number is the destination output switch number. The input circuit number is shown in Fig. 13 and can easily be retrieved with knowledge of VPI and VCI. The Applicant has not shown any unique advantage in storing these entities in the routing table. Certainly the VCs have a QoS defined by a minimum and peak cell rate, which is initially agreed in a Service Level Agreement and should be stored in a database or table. The advantage of storing an intra-switch connection identification along with these items is not established and is merely taken as a design decision.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus that resulted from the combined invention of Hoogenboom and Zhang by modifying the input controller to store parameters like the output interface number in a header conversion table, the motivation being Hoogenboom in Paragraph 2 discusses how cells arriving at an input port are switched to an output port but fails to detail the mechanism involved in routing these cells arriving at the input. Endo shows how the cells are processed at the input to determine the destination port using a header conversion table.

13. Regarding **claim 6**, the combination of Hoogenboom, Carr and Zhang teaches all aspects of the claimed invention as set forth in the rejection of claim 3 but does not disclose an ATM switch, wherein the output virtual channel cell rate control section stores a service class, a virtual channel minimum cell rate, a virtual channel peak cell rate, a virtual path peak cell rate, an output circuit number and an output virtual path

identifier/virtual channel identifier of contents of a contract concluded in advance in a corresponding relationship to an intra-switch connection identification number of each cell.

Endo discloses an ATM switch, wherein the output virtual channel cell rate control section stores a service class, a virtual channel minimum cell rate, a virtual channel peak cell rate, a virtual path peak cell rate, an output circuit number and an output virtual path identifier/virtual channel identifier of contents of a contract concluded in advance in a corresponding relationship to an intra-switch connection identification number of each cell. (**Endo shows in Figure 12 what an ATM output port controller can store that includes output interface number and output VPI. It is clear to one ordinarily skilled in the art that an ATM switch that uses policy based traffic shaping will have to store various thresholds in a table during provisioning.**)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus that resulted from the combined invention of Hoogenboom, Carr, and Zhang by modifying the output controller to store parameters like an output circuit number and an output virtual path identifier/virtual channel identifier. The motivation being Hoogenboom has indicated in Paragraph 29 that traffic rate limitation can be policy based like Carr's VP shaping policy based on PCR as indicated in Column 4, Line 43 but fails to indicate how these parameters are stored. Endo shows how these parameters are stored in a Virtual Path Connection Management table in Figure 12.

14. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoogenboom in view of Zhang and Carr as applied to claim 7 above, and further in view of Watanbe (US 5, 771, 231).

Watanbe discloses an ATM exchange useful in an ATM network.

The combination of Hoogenboom, Carr, and Zhang teaches all aspects of the claimed invention as set forth in the rejection of claim 7 but does not disclose a switch wherein the input processing section is further configured to: associate, with each received cell, an intra-switch identification number, and wherein the output processing section being further configured to: identify connection information for each cell based on the intra-switch identification number associated with each cell.

Watanbe discloses a switch wherein the input processing section is further configured to: associate, with each received cell, an intra-switch identification number, and wherein the output processing section being further configured to: identify connection information for each cell based on the intra-switch identification number associated with each cell. **(See Figure 3 and Figure 4 and Column 9, Lines 45-65)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus that resulted from the combined invention of Hoogenboom, Carr, and Zhang by allowing the use of intra-switch id in the form of tag, the motivation being the apparatus of both Hoogenboom and Watanabe are ATM switches and switches normally route internally by adding headers or tag. A further motivation being Hoogenboom in Paragraph 2 discusses how cells arriving at an input port are switched to an output port but fails to detail the mechanism involved in routing

these cells arriving at the input. Watanabe shows the use of intra-switch id in the form of tag in routing cells in an ATM switch.

Response to Arguments

15. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following Non Patent literature is cited as the state of the art in rate and credit based traffic control technique for ABR services in ATM networks:

Lihong et al, "Rate-based Traffic Control Technique in Credit Style for ABR Service in ATM Networks", IEEE, 1998, Pages 1-5 (Relevant Section is Section 2.2)

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Habte Mered whose telephone number is 571 272 6046. The examiner can normally be reached on Monday to Friday 9:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 571 272 3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HM
02-28-2006

JOHN PEZZLO
PRIMARY EXAMINER